The Story of Metrotopia: Notes from the Design Process of a Virtual City

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Publication date:
2009

Document Version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Gürsimsek, R. A. (2009). *The Story of Metrotopia: Notes from the Design Process of a Virtual City*. (pp. 1-13).

THE STORY OF METROTOPIA: NOTES FROM THE DESIGN PROCESS OF A VIRTUAL CITY

WHAT IS METROTOPIA?

Metrotopia is a virtual city, designed and built in Second Life for a series of experiments and observations on digital communication, social interaction, design and entertainment in virtual worlds. The foundation of the city resides on "Research Island Denmark", which is a virtual island \ parcel run by "Sense-making strategies and user-driven innovations in Virtual Worlds" research Project in Department of Communication, Business and Information Technologies (CBIT), Roskilde University, (Denmark).

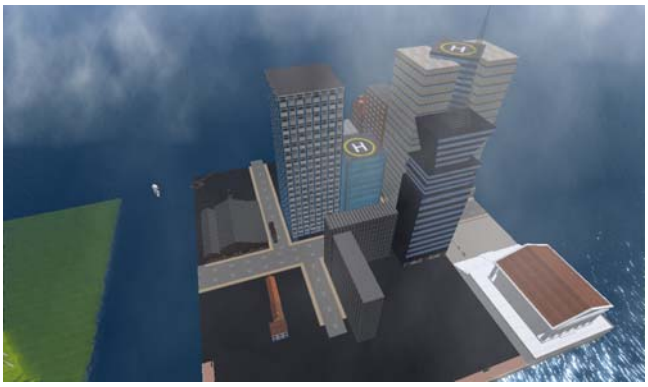

Fig.1. Airline view of Metrotopia (from building process)

The initial concept of Metrotopia is specifically designed and built for Virtual Worlds and Entertainment research conducted by Dr. Carrie Lynn Reinhard, with the full title of "Metrotopia – The City of Superheroes & Superheroines" to be consistent with the experiment's goals and methods. In addition, the concept of a virtual city in which the avatars can identify themselves with virtual superheroes and villains is intended to imply a certain sense of community within the city, as well as to ease the participants' sense of belonging by providing them with a pre-defined set of costumes and accessories that represent the style of comic books and sci-fi environments. For this purpose, the city has a modern urban visual style with a number of skyscrapers, open spaces for gathering, and a number of interactive places in which participants can experience different aspects of play-acting a superhero/heroine. The specific locations designed for facilitating this interaction in the city are: Costume Bazaar (and the welcoming area), Museum, Metrotopia Park/Sandbox, Gym and the Fight Club along with currently developing residential area and Metrotopia Library. Although the characteristics of these locations and their design considerations will be further explained in this text, it is necessary to state that all these virtual places are mainly focused on creating an accessible, usable and enjoyable platform for participants to explore, play and interact as a part of their online experience in Second Life, as well as providing an interactive digital medium for experimentation and observation for virtual worlds research.

DESIGN PROCESS OVERALL

The (ongoing) design and construction of Metrotopia has been conducted by a multi-disciplinary team involving freelance and in-house designers as well as researchers and consultants. The Metrotopia project was originally undertaken by Tommy Nilsson (SL: Doctor Asp), a professional designer working in Second Life and R. Ates Gursimsek (SL: Mandal Vlodovic), industrial designer and PhD student in virtual worlds research group. Furthermore, some of the design tasks (such as superhero costumes) were outsourced to other designers and/or several objects inside the city were purchased from different retailers inside Second Life.

Fig.2. Metrotopia Design Team at an inworld meeting

As mentioned above, Metrotopia was built to facilitate an online, experimental 3D virtual space for the research team. For this purpose, members of the research team also participated in the project throughout the design process in several ways. Dr. CarrieLynn Reinhard, as the conductor of the experiment, has participated throughout the process both by evaluating the structure with regard to the purposes of her experiment, and as a member of Metrotopia Design Team. Dr. Sisse Siggaard Jensen, as the leader of the research team, has also been the member of the design team both as a consultant for the overall project, and by her experiments with virtual BOTS that would populate the city. Dr. Dixi Louise Strand (research team project management) and Odul A. Gursimsek (outsourced video production) have also been involved in the project's final stages.

HOW METROTOPIA DESIGN TEAM WORKED

As designers of the Metrotopia project, the overall design, conceptualization, and building works were conducted collaboratively by T. Nilsson and R.A. Gursimsek. However, especially in the first stages of conceptualizing the structure of the city, generating a draft map of the locations and deciding on the functions of these locations, the research team and designers collaborated. During these stages, several meetings, both inworld and in RL, were done in Roskilde University and/or in Metrotopia. In these meetings, the general visual style of the city landscape, accessibility of specific locations and their contents were discussed. During the inworld meetings, the design team had opportunities to try different design possibilities and evaluate them in real time inside Metrotopia.

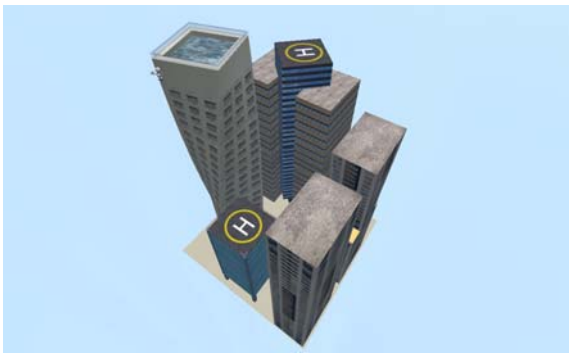


Fig.3. & 4. Snapshots from the designers' workspace, which is located 900 mt above the actual city

In addition to the actual city parcel placed on Research Island Denmark, another platform was build 900 mt above Metrotopia (since Second Life allows the use of Z axis as a part of the actual parcel) and the construction of virtual objects and buildings were tried out in this workspace. As the functions of specific objects and places were discussed and decided by the design team, Nilsson and Gursimsek specified the location in the city, the dimensions and the visual characteristics of the designed object/building (geographic position, its relation to neighboring objects, usability and attractiveness, i.e.).

After collaboratively transforming these decisions to 'design briefs', several virtual mock-ups and alternative design solutions were generated, evaluated and modified. The collaborative working possibilities of Second Life, and the inherent building engine enabled the designers to have frequent inworld meetings, establish instant communication during the process via text/audio chat and work together on a design task in real time.

As the buildings that would generate the skyline of the city were designed, various building methods were used, such as creating some as massive blocks using mega-prims[1] and applying textures on them, or making the building space accessible by separating it from the environment by walls and organizing the interior by the arrangement of virtual objects inside. 3D modeling and texturing of these buildings were also done collaboratively, and by the help of various internet material libraries and CG websites. As the location, dimensions and main structure of the objects/buildings were decided upon, the fitting textures were searched, discussed and applied on the design to get the desired effect.

[1] Mega-prims are large-scale building blocks to be used in constructing objects with any of the three dimensions being larger than 10 mt, as the regular SL prims allow no larger than that.


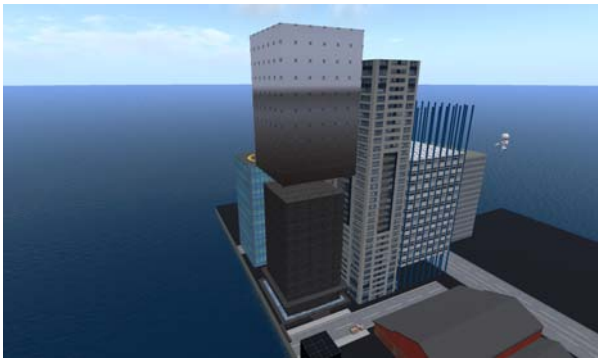

Fig.4. (left) Gursimsek (Mandal Vlodovic) and Nilsson (Doctor Asp) deciding on the placement and specifications of buildings. Numbers are used to identify each spot.
Fig.5. (right) Placement and modification of a glass skyscraper. The buildings are modified to keep the consistency with their surroundings and the general skyline of Metrotopia.

After the construction of each object/building was finished, it was taken into (or exchanged between) the inventories of the designers, and placed in its location inside the city. Minor modifications were also done during the placement of the object, since its overall consistency with its surroundings is important. The major concern at this stage was designing a skyline view of the city that is modern, clear, appealing to the visitors and consistent with the context of a Superhero/heroine city.

On the other hand, design tasks for the Metrotopia project were not limited by the construction of 3D objects and buildings, but they also involved the design of graphics, posters, maps and, last but not least, the logo for the city. Considering the application of 2D graphics (such as posters, advertisements, i.e.) on the surfaces of the city as one of the essential elements for creating an urban ambiance and an identity for the place, several graphic elements were designed and applied. (QUote cale banding)

> "The logo was designed because we want to have a specific visual repreentation for the island for branding purposes. We want to actually create a presence in Second Life so we have a branding. And we'll find this branding occuring all over the city ..." CarrieLynn Reinhard (Researcher, Virtual Worlds Research Group)

Fig.6. Alternative logo designs for Metrotopia, from which the one on the right has been selected

The Metrotopia logo was designed with a number of alternatives, from which the one used was picked through discussion. Reflecting the visual language of comic books and the superhero genre was the primary aim, along with coming up with a striking, distinguishable and easily remembered logo that can be used with the other

posters and graphics inside the city. By the repetition of Metrotopia logo on the posters, the welcoming arch, and orientation/teleportation kiosks, it is intended to strengthen the visual identity of the city similar to creating a brand-image. This logo is also modeled in 3D and placed in front of the Museum (in the middle of the city square).

Fig.7. Orientation posters designed for representing and facilitating teleport to specific locations in Metrotopia

Another task to involve the use of graphics was the orientation/teleportation posters that would represent the same visual language, inform the visitors about certain locations inside the city and provide teleportation to the selected location upon a click on the poster. These posters were placed to the entrance of the city, right after welcoming arch and the costume bazaar. Although these 4 posters are not the only way to explore the city by teleportation between specific locations, their visual consistency with the overall style and their function as representational graphics is considered important for easing the first-time visitor experience and strengthening the links to the visual language of the genre.

Another solution for easing the visitors' movement inside the city is the teleport kiosks that are placed in various locations , close to the more interactive regions. While the form of these objects reflect the general visual consistency, the teleport kiosks also facilite orientation by reminding the visitor the major sights to visit and explore. In addition to the teleport kiosks and the posters, a map of the city with teleportation function is also provided at the entrance of the city.

It is intended to enable participants to get familiar with the locations and their contents, so that Metrotopia is visited more frequently and with more users than merely the participants during the experiment. On the other hand, it is not enough to build functional virtual spaces and conduct pre-defined experiences in them to obtain continuous interaction, since the ever-growing landscape of Second Life makes it hard for visitors to follow-up one single location. For this purpose, mailing

groups were formed to inform visitors about the upcoming events, and new participants.

MAJOR SIGHTS FOR INTERACTION

Although Metrotopia itself is considered as an interactive virtual environment, some regions of the city are designed purposefully to enhance the social interaction, as well as interaction with the system, in various ways and aspects. These locations are:

- Costume Bazaar (and welcoming area)
- Museum
- Metrotopia Park/Sandbox
- Gym
- Fight Club

All of these places relate to a set of specific actions that the participants of the experiment are intended to experience in Second Life, such as character building, learning, design and social interaction. In this respect, one of the major concern during the design process was to create interactive and information-rich places, which the participants can explore and enjoy without needing further instructions.

COSTUME BAZAAR

When the visitors are teleported into Metrotopia, they arrive in an abandoned room with old rusty objects, burning barrels, and challenging posters (i.e. "Are you ready to become a Superhero?") and a dark walkway which takes them to the actual welcoming area. The Costume Bazaar consists of information surfaces that welcome visitors to the city and informs them about the context, a welcoming arch with the Metrotopia logo and several booths containing free costume parts and accessories for Superhero/heroine avatar looks.

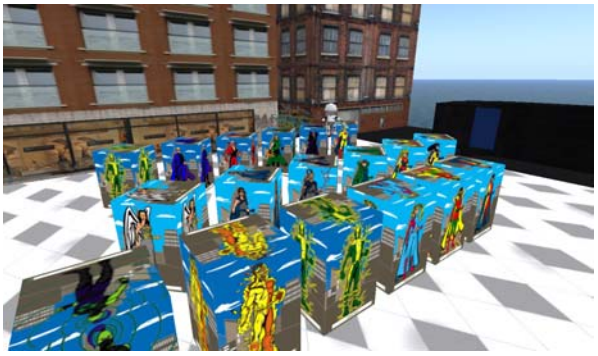

Fig.8. (left) View from the Costume Bazaar

Fig.9. (right) Snapshot from the design process of the bazaar. Without the designed booths, a number of boxes with pictures of superhero costumes were placed to identify the location.

The aim of this place is first to introduce Metrotopia to the visitor, provide information about the city's context, and provide necessary tools for character building that is consistent with the overall concept. It is also important for the first-time users to find a place with easy and accessible avatar modification options, as well as getting to know the basic functions (such as clothing, moving, camera controls, i.e.) in Second Life.

Design of Costume Bazaar is intended to reflect the dynamic and eclectic ambience of an actual open market, with its modular design, various types of booths for separate categories of objects and an open area for exploration and experimentation during the avatar design. For this purpose, different costume parts for both male and female avatars were categorized (i.e . shirts, pants, capes, masks, underwear, boots) and various types of accessories (i.e. weapons, wings) were also placed in separate booths for enabling visitors to come up with unique and personalized avatar creation.

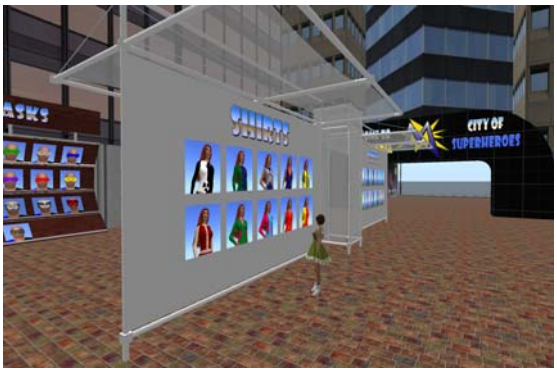

Fig.10. An avatar shopping at the Shirts booth in Costume bazaar

There are four major stylistic categories of the booths designed for the costume bazaar:

- Modular metal booths, on which shirts and pants are displayed. In these booths, the main design consideration was to place the most significant components of male and female superhero costumes in the middle of the bazaar, and place them on a visually striking, modern and modular structure. The modularity concept here, as well as within the overall Costume Bazaar, is intended to make additions and modification possible for further alterations in the city.

- Wooden booths for hoods, boots and underwear. These booths are designed in different sizes to contain different numbers of objects for each category. They are places in front of the eastern wall of the bazaar, so that they would appear as older and more stable parts. Booths containing masks and gloves have different wooden textures and forms then these.

- 2 booths with a more conceptual decoration with desks and tents on top for displaying skins, shapes, hair and accesories.

- A futuristic stand, which is lit by green, neon-like lights on its sides and a metallic support structure for holding the presentation surfaces. This stand is used for capes.

These presentation booths were designed and built by Ates Gursimsek, in accordance with the specifications agreed on by the design Team, and the final placement of the boots (the interior design of the bazaar area) was done by the collaborative work of Metrotopia Design Team. As the team gathered together in an

inworld meeting, each booth design was evaluated, and the overall placement of the various booths were discussed. In addition, the functions for each booth (which booth contains which parts for the costumes) and the organization of these were decided with the consideration of easing the visitor exploration and trial. Another concern, during this process, was to separate male and female costume parts, and locate them separately but close to each other. However, as most of the costumes were designed for both fitting sexes by the *outsourced costume designer*, it is possible to alternate the possibilities by selecting costumes from each category, and still creating a meaningful avatar design with the possible parts involved.

Besides its connections with eastern neighboring avenue by two narrow streets and its narrow opening to the sea, the costume bazaar's main opening to the city is the wide passageway on the northern side from under the Metrotopia Arch, across the Metrotopia Museum. This passageway is placed under one of the large buildings surrounding the market, and it not only functions as a gateway to the remaining parts of the city, but it also facilitates visitors' orientation by the posters and the map placed on its two walls. Here it is intended to welcome the participants after they created their avatars for the session, and inform them about the possible places to visit inside the city (with comic-book like graphics to support the concept).

MUSEUM OF SUPERHEROES

When the participants pass this gateway and arrive in the open square, they see the Greco-Roman style Museum building with marble columns and a triangular roof, and its high entrance with white marble steps. The museum is designed to contain textual and audio-visual information on the context of the experiment and the city (Superheroes) and it is also intended to be an interactive environment. While the design and organization of the museum building is mainly conducted by Tommy Nilsson, the chief designer of the project, it was nonetheless a collaborative work of the design team. CarrieLynn Reinhard participated in the collecting and classification of the information placed inside, and Ates Gursimsek was responsible with the research on the design of similar RL buildings, and application of appropriate textures. The evaluation of the design and the interior organization was also done collaboratively through several inworld and real life meetings. At these meetings, several possible placement combinations and ways to transportation within the museum were discussed. By the real-time modification possibilities of Second Life, these inworld meetings were also used for real-time modification of the space design, such as application of different textures and placement of information surfaces.

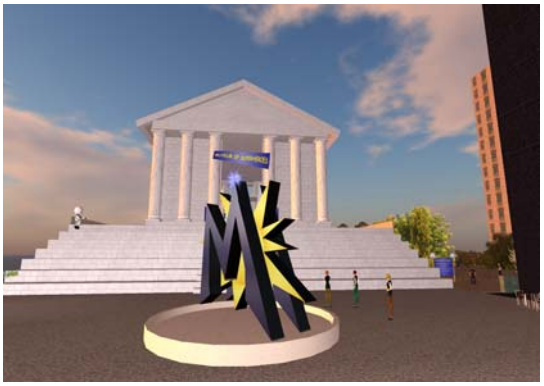
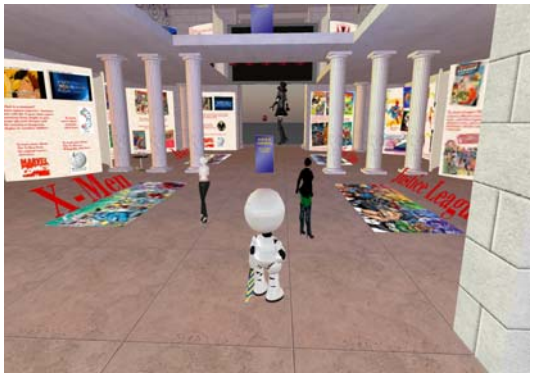

Fig. 11. & 12. Exterior (left) and interior (right) shots from Museum of Superheroes

At his stage of the design process, the general complexity of the design was considered not only as a problem of how the content was selected and presented, but also by the ways to travel and explore the virtual place provided for the visitors. As the information was collected and categorized by CarrieLynn Reinhard, Tommy Nilsson designed modular presentation boards, on which the text and the visuals were placed. These presentation boards were distributed into the 2-floor area of the museum according to the categorization, and a large screen with YouTube links of selected Superhero movie trailers was also placed at the northern entrance.

Fig.13. View from the museum with the staircase in the middle. The staircase idea was later replaced with teleport kiosks to faster instant transport.

For exploration, the first design solution was to include a large stairway that connects the two upper floors with the entrance floor, and facilitates traveling inside the museum by walking around. However, considering the other possibilities of virtual worlds, which make exploration easier and faster, the staircase idea was replaced by teleport kiosks, which enable the visitor to directly arrive in the top floors and then, fly or walk around the desired region. Replacement of the large staircase with two teleport kiosks also provides a wider view of the whole space from the entrance, and makes orientation easier.

METROTOPIA PARK/SANDBOX

Starting from the southern facade of Museum, an open air park and a children's playground is located. This park is separated from the main avenue with tall buildings, and the sea line (and neighboring Wonderful Denmark island) can be seen on the north side. Metrotopia Park is also a sandbox, which means a rezzing/building-free zone for all visitors regardless of their being a member of the owner group of Research Island Denmark. The motive behind the idea of including a Sandbox in the Metrotopia was their role in enabling visitors to experience building and experimenting with virtual objects; thus, providing a platform for user participation through user-generated content. The Sandbox is also intended to provide the research group with an observation field in their further activities, experiments and lectures.

The sandbox idea and the park coincides in their basic structure, in that they both require open spaces that allow visitors to travel inside freely and facilitate social interaction. While the design of the park reflects the pastoral smoothing affect of a

peaceful and quiet zone (with the sea line, surrounding buildings, playground and animated trees that float with the non-existent wind), a sandbox also requires a wide

open space for building in all three dimensions. For this purpose, a wide open terraneous zone is left empty for building purposes.

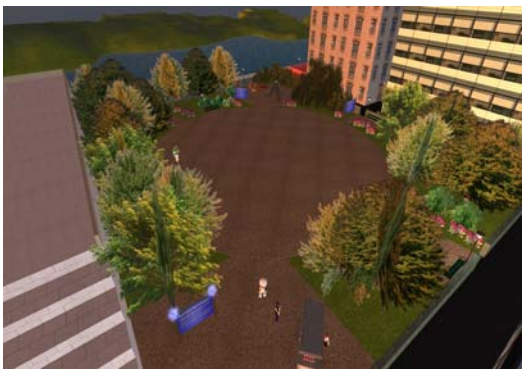


Fig.14. & 15. View from Metrotopia Park/Sandbox (left) and the hotdog cart at the southwestern entrance (right)

There are several components of the park/sandbox that are placed purposefully, in order to enhance social interaction. The children's playground, which involves interactive virtual toys is one of these specific locations. Another one of these components is the Freudian bench, which is a virtual bench scripted with two different impersonating (Freud & Pandora) chat-bots. As the visitor sits on the Freudian bench, they welcome her and begin a text-based conversation. In addition to this psychoanalytic conversation generator bot, the chair also contains a number of sitting positions for the avatar, which enhances the experience of interaction and immersion.

The hot-dog cart standing at southwest entrance of the park functions as a virtual hot-dog cart, which copies virtual hot-dogs and beverages into visitors' inventories upon clicking. Form and visual style of this hot-dog cart was derived from the research on images of several carts, especially from New York, London and comic book drawings that imitate these cities. The design and building process of this hot-dog cart was also recorded, narrated and edited to be a part of the research group's video productions, as an instructive representation of the design-based interaction in Second Life.

RESIDENTIAL AREA

The north-east corner of Metrotopia consists of several middle-sized buildings that are organized to be connected by narrow streets and a dead-end back alley. Design of the houses reflect a mixture of Scandinavian and American urban styles, all of them being 3 to 4 stories high brick buildings with staircases opening to the street. The residential area was organized to facilitate surprise effects and provocation, mainly by the future implementation of BOTs attacking the visitors individually or in groups.

Fig. 16. Air view from the residential area

PROVING GROUND GYM

Located in the first floor of one of the buildings on main avenue, Proving Ground Gym offers visitors several interactive experiences, from training in one of the many exercise machines to gaining new superhero skills and taking commemorative snapshots. The gym is also designed as a social interaction place, in which visitors can impersonate their superhero characters and engage in specific actions.

The most dominating, and visually determining, of these experiences is the training equipment on which visitors can try bench pressing, cycling, rope jumping or heavy lifting, etc. The trampoline placed at the center can accommodate up to 4 visitors at the same time, allowing them to make various dynamic jumps. The arrangement of these virtual exercise machines is similar to that of a real life gym. However, one major obstacle for enhancing social interaction through physical development activities is that it is not possible to develop an avatar's body characteristics through training, but only through additions of scripts, animations and/or body attachments in Second Life.

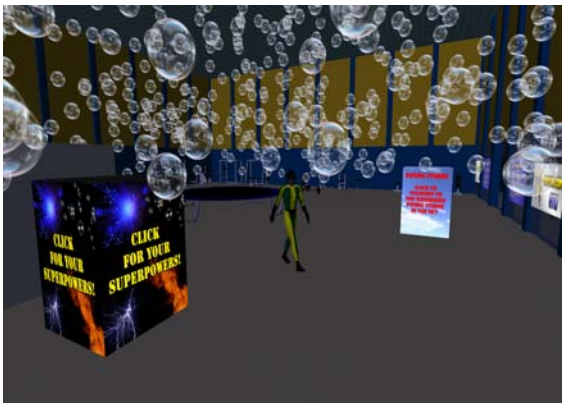

Fig.17. (left) Exercise machines from Proving Ground Gym
Fig.18. (right) An avatar using her superhero abilities taken from the box labeled "Click For Your Superpowers"

At the east entrance of the gym, a large box with a striking "Click here to get your superpowers" banner stands for providing the visitors with a number of animated superhero abilities (such as colorful bubbles flying randomly around the avatar, lightning or fire effects, i.e.). Visitors are expected to try these visual animations by wearing the selected skill from their inventories.

The concept behind the posing studio, which lies on top of the Proving Ground gym building, was to create a place where avatars, who fully transformed into their superhero characters with their costumes, training, and animated skills, can take snapshots of their characters. It was also intended to provide them with a striking background image, and a wide range of memorable images from the city on their snapshots. For this purpose, pose balls with several animated poses are placed on top of the building, which was found to have a wide view of the horizon line, the city that is below, and a clear view of the sky (for flying and jumping poses). Transportation between the gym and the pose studio was maintained by teleport kiosks in both locations.

FIGHT CLUB DOJO

Across the residential area, to the southeast of the city, a harbor-like area was designed to contain the Fight Club. Visually, this area differentiates from other parts of the island mainly by its rusty and industrial form. Fight Club Dojo building is also an old-looking red wooden building with 2 floors, and with posters and graffiti's on he walls. The building has two entrances: a main entrance from the Main Avenue, and a back door which opens to the harbor area.

Fight Club Dojo is the place where visitors can challenge each other by using various weapons (guns, light sabers, hand grenades, i.e.) or practice the use of these weapons in a shooting range. These weapons are presented on the wall at the entrance of the building. Players can copy their weapons of choice by clicking, and they start using the weapons by wearing them onto their avatars. Here it is aimed to provide visitors with necessary tools for interaction in a clear and user friendly manner, and enhance the superhero genre concept by implying the challenging nature of the place.

Fig.19. (left) Street view of Fight Club Dojo
Fig.20. (right) View from inside the Dojo. Four avatars are challenging each other with light sabers.

The idea of creating a Fight Club in Metrotopia was derived from the norms of the genre, as practicing weapons of choice and fighting villains are major characteristics of most superheroes. The aim of this location is to facilitate this kind dynamic interaction, by enabling visitors to fight each other by running/flying around a 2-story building where they can use the barrels, large boxes or other objects for camouflage and shoot other avatars. For increasing players' immersion into the game, the parcel on which Fight Club stands was modified to contain health/hit points for each player. As one player gets shot enough to reduce her hit points to zero, the player is teleported into her home location (as a representation of inworld death).

Another possibility for players to practice with the provided weapons is the interactive shooting range placed in the northeast corner of the building. This game has 3 difficulty levels, the high scores of which are kept in its memory. By keeping record of the score, the concept of challenging other players (thus the immersion into the social interaction in Fight Club) is enhanced and it is possible to keep track of frequent players. The shooting range is not designed or programmed by the research team, instead brought in by Doctor Asp and included in the design of the Fight Club.

Fight Club is also a Sandbox, where the visitors can build or rez objects from their inventories and use. This feature is mainly the result of a technical specification of Second Life, which requires the bullets thrown by any gun to be *rezzed* (created in virtual world) to exist. This feature also enables the players to create new objects with which they can modify the space for their fight, or create virtual enemies (bots, animated objects, i.e.) to play against. Similar to the function of Metrotopia Park Sandbox, the ability to create new virtual objects and use them in the virtual fighting arena is believed to support user generated design and innovation, and increase participation.